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Research Paper

Provide a model for managing claims regarding the PMBOK standard

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ARTICLE INFO	ABSTRACT
<p>Received: 4 May 2021</p> <p>Reviewed: 17 May 2021</p> <p>Revised: 6 June 2021</p> <p>Accepted: 20 June 2021</p> <p>Keywords: <i>Change, Claim, PMBOK, Contracts</i></p>	<p>Iran is very rich in oil and gas, which is why the Iran government is investing billions of dollars every year in oil and gas facilities to improve the country. The oil and gas refinery construction industries are very complex and involve multidisciplinary contributors. In this environment, many changes and claims appear. Changes and claims are commonly considered negative events, and thus, should be kept away from the project. With considering this concept, this paper presents the results of a study of the types and causes of project claims in the Persian Gulf Star Gas Condensate Refinery project in Bandar Abbas. The data were analyzed and the consequences of this analysis along with advice on how to reduce/prevent claims in construction are then presented.</p> <p>© 2021 IJIE. All rights reserved.</p>

1. Introduction

Iran government is investing billions of dollars every year in oil and gas projects. One of the most important projects in the field of oil and gas in Iran (especially in the new government) is the Persian Gulf Star Gas Condensate Refinery in Bandar Abbas. This project Includes Refinery, Feed Pipeline and Sea Water Intake Sub-Projects. With start of this project Iran shall become independent in producing gasoline.

It is very important to manage the projects well to prevent time and cost overrun. Different project management standards have been developed. Some of these are Project Management Institute: Project Management Body of Knowledge (PMBOK), CCTA Projects in a Controlled Environment (PRINCE), International Project Management Association (ICB), Association for Project Management Project Management (APM), International Organization for Standards: Guidelines to Quality in Project Management (ISO10006), Software Engineering Institute: Capability Maturity Model (CMM), US

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Department of Defense: Earned Value Management System (EVMS), Canadian Government: Cost/Schedule Performance Management Standard (C/SPMS)(Reich et al, 2006) .

Among of the standards mentioned above, the PMBOK is more recognized in Iran, which is why it was decided to use it for the base of managing this study. One of the key problems in developing countries is that changes are not managed well in the projects. The result is claims in the projects and perhaps the projects are terminated. Zanelidin (2006) has presented the results of a study of the types, causes, and frequency of construction claims in the emirates using a data collected for 124 claims related to different projects. The data are analyzed to identify problem areas and recommendations to reduce claims in construction projects. Kumaraswamy, and Yogeswaranb (2003) analyzed different extensions of time (EOT) due to excusable delays, and EOT claims in Hong Kong. Reasons for delays in the submission and assessment of EOT were also searched.

Considering less research on Claim and by the base on the PMBOK a model to manage Claims in projects has been provided with a case study in Persian Gulf Star Gas Condensate Refinery project in Bandar Abbas (Stackpole, 2013).

This paper organized as follow. In the second section the definition of change and claim has been defined. In the third section with the information gained from the previous section a checklist is produced to find the main causes of claim and then we recognized the main causes of claim for oil and gas projects. Finally, in the fourth section we maintained a model to manage claims in the projects.

2. Definition of change and claim

One of the specifications of a project is that it is progressively elaborated; it means that with proceeding in project steps, the detail information of the project will be defined. For this reason is during the project many positive or negative changes may occur. Changes in a project cannot be completely prevented so the changes should be controlled. The definition of change and claim shall be discussed as follow:

Change: Change is any change to the project baseline. The change cause can be an error in defining the product or the project, a value-adding change or an external change. Change always requires an adjustment to the project baselines.

Change requests to may result from the Administer Procurements process. Change requests are handled for analysis and approval through the Perform Integrated Change Control process (Shirazi, 2021).

Claim: Claim is a contractual means and includes actions taken by the seller or contractor against a buyer, or vice versa, for consideration, compensation, or payment under the terms of a legally binding contract or to resolve a time issue for the following reasons: A request, A demand for something due or believed to be due, Assertion of rights by a seller or contractor, A requested but unresolved change, Disputed change or it can be a result of an action, direction, or change order against the agreed terms and conditions of a contract and that cannot be economically resolved between the parties.

Claims can be viewed from the angles of the party making the claim (seller or contractor) or from the angle of the one defending against claim (buyer or client). From the buyer or client's outlook, the goal

for claim management is to avoid claims entirely and, if not, to resolve them at the first chance for the least cost and least interruption to the project (Nozari et al ,2016).

Though, the difference between a claim and a change is the element of disagreement among the parties as to what is due and whether or not anything is due. If agreement is reached, then the claim disappears and becomes a change order or a modification. If not, the claim may continue to negotiation, mediation, arbitration or, finally, to litigation before it is finally resolved.

Claims are managed throughout the contract life cycle, usually in accordance with the terms of the contract. If the parties themselves do not resolve a claim, it may have to be handled in accordance with alternative dispute resolution followed by procedures established in the contract.

3. Main Factors of claims

In this section with use of the Delphi method (Rowe et al, 1999) the reasons of claim is collected; a Questionnaire list is buildup on the base of the PMBOK and the documents of Persian Gulf Star Gas Condensate Refinery then it was sent to 25 experts in the project; answers were collected and then the results were back to them until agreement was reached. By the end with the use of an affinity diagram the claim causes were sorted in similar groups (Rustamova ,2021). The questionnaire is in table (3) and by the base on PMBOK it has been divided to 5 categories; initiating, planning, executing, control and closing process groups:

Table-1. Questionnaire

Process groups	Questions
Initiating process	<ul style="list-style-type: none"> ○ Is there a process to develop the project charter? ○ Does the client know precisely what they need? ○ Have the business needs been defined? ○ Are the assumptions documented? ○ Are the constraints documented? ○ Are the stakeholders identified?
Planning process	<ul style="list-style-type: none"> ○ Is there a process to collect the project requirements? ○ Is there a plan to manage the configuration? ○ Is there a correct description of the project terms? ○ Is the project scope statement used as the base for future project decisions? ○ Is the work break down structure used to manage the project life cycle? ○ Is a work break down structure dictionary used to manage the work? ○ Is the change management system procedure prepared by a qualified team? ○ Are the project team members involved in the preparation of the change management plan? ○ Is the change management plan checked by a third party? ○ Is there a communication management plan for the project? ○ Is there a procedure to prepare the project reports?
Executing process	<ul style="list-style-type: none"> ○ Are only the approved charges implicated? ○ Are the information sent by the procedure?

Process groups	Questions
control process	<ul style="list-style-type: none"> ○ Is the change control system used in the performing organization? ○ Are the change requests documented? ○ Is the power and responsibilities of the change control board used? ○ Is it determined that a change is needed? ○ Are the changes integrated with the other knowledge areas? ○ Is information informed to the stakeholders on time? ○ Are the changes and the revised PMP informed to the stakeholders on time? ○ Is the configuration management plan used to integrate change across project areas? ○ Is the PMP Updated on time?
Closing process	<ul style="list-style-type: none"> ○ Are the works confirmed to requirements? ○ Are the product closures completed? ○ Are formal acceptance gained?

By the use of the checklist on 4 subprojects, the 18 main reasons of claim in refinery projects have been identified as changes, poor change control, Extra-work, unmanaged expectations, Delays, Different site conditions, poor information transformation, contract documentation interruption, contract ambiguity, poor planning, poor documentation, poor information transformation, not using scope statement for future decisions, not having a management plan, not obtaining quality of work, not obtaining progress of work and scope creep. By the use of the Pareto rule and an analysis on the causes of claim, the first nine main causes that were about 70% of the causes of claims in the projects have been identified. With the help of the opinions of mentors, documents, previous projects, articles and books (yang, 2021), the main causes of claim have been collected in table no. 3:

Table-2. Main causes of claim

Main Claim Categories	Claim Cause
Changes	<ul style="list-style-type: none"> ○ Change in the type of the product ○ variation orders ○ Oral change orders by owner ○ Changes in material and labor costs ○ Variations in quantities ○ Government regulations ○ External changes: Change of law, technology and economic situation. ○ Change in documents ○ Change of client's management team ○ Changes in capacity of units ○ Changes in basic engineering ○ Changes in equipments because of conflict with other equipments ○ Change of contractors ○ Change of client key stakeholders ○ Changes in drawings because of conflict with other discipline drawings ○ Construction changes for example: changes in the structure because of soil weakness, changes of piping, changes in the foundation due to conflict with the equipment and etc. ○ Changes that a licenser issues ○ Changes in the location of the construction

Main Claim Categories	Claim Cause
Extra-work claims	<ul style="list-style-type: none"> ○ Oral extra work by owner ○ Increase of equipment and material ○ extra capacity of units
Delay claims	<ul style="list-style-type: none"> ○ Delay caused by owner ○ Delay in payments by owner ○ Delay caused by contractor ○ Design errors or omissions ○ Execution errors ○ Termination of work ○ Suspension of work ○ Accidents ○ Lack of experience in the project team ○ Not considering the facilities of the contractor during signing the contract ○ Delay of the suppliers ○ Delay in detail engineering ○ Lack of material ○ Work conflicts ○ Conflict between contractors ○ Delay of shipment ○ Client financial problems
Different site conditions Claims	<ul style="list-style-type: none"> ○ Change of weather ○ Change of site leaders
Contract and Contract ambiguity claims	<ul style="list-style-type: none"> ○ Poorly written contracts ○ Low price of contract due to high competition ○ Subcontracting problems ○ Defining the scope by inexperienced experts. ○ Misconstruction of the business needs. ○ Bad realization of client's needs in defining the scope. ○ Unrealistic project goals. ○ Variety in the size and the detail of scope statement and not checking it by a third party. ○ Lack of clarity about system boundaries ○ Poor documentation ○ Changes in the contract
Planning	<ul style="list-style-type: none"> ○ Estimating errors ○ Scheduling errors ○ Unreal time schedule because of lack of correct understanding of project and the resources needed ○ Unreal studies on the market ○ Not coordinating among the internal and foreign procurement ○ Lack of technical knowledge ○ Not considering the complete scope of the project ○ Changes of time schedule
Poor change control	<ul style="list-style-type: none"> ○ Not involving the project team for defining the procedures. ○ Not checking the procedures by a third party
Poor information transformation	<ul style="list-style-type: none"> ○ Not understanding of the project goals and baseline and the situation of the project ○ Lack of configuration management plan. ○ Lack of communication.
Scope creep	<ul style="list-style-type: none"> ○ Changes that are made informally. ○ Changes that are initially appear as minor and insignificant changes.

Main Claim Categories	Claim Cause
	<ul style="list-style-type: none"> ○ Changes that generally do not seem necessary to document at that time. ○ Changes that are Customer's technical representative requesting work. ○ Changes that are usually an addition to scope without planning. ○ lack of proper project objectives ○ weak communication among parties

4. Managing claims

As it can be understood from the table, it is obvious that claim does not occur in the first phases of the project and it usually occurs in the next phases; it is almost impossible to prevent claims; that is why a claim management system should be established for the project. By the base of the causes of claim in table 2 and the processes of the PMBOK, a management process for managing has been developed:

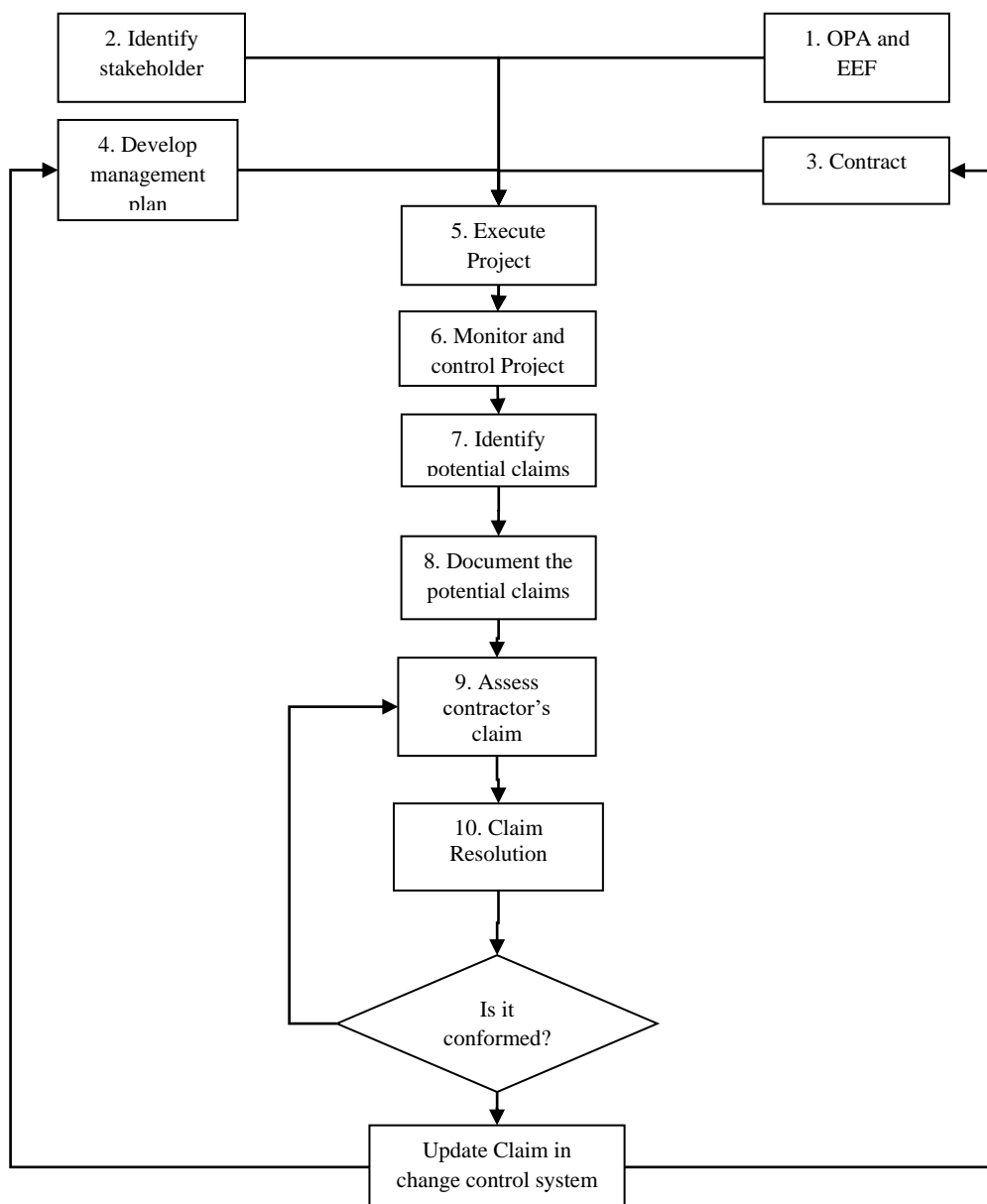


Fig-1. A claim management model

1. Organizational process assets / enterprise environmental factors:

A procedure should be developed for change and claim management and information distribution. Besides the procedures, Lessons learned should be collected for the use of the future projects (Aliahmadi et al, 2015).

2. Identify stakeholders:

Identify all potential project stakeholders and related information, such as their roles, departments, interests, requirements, expectations, and influence levels (Kazemipoor & Shirazi, 2009).

3. Contract:

Before signing a contract, the potential contractual claim situations should be recognized to prevent claim, therefore, claim management starts with sufficient knowledge of the contract requirements, which leads to alertness that some activity may involve a change in the contract.

Proper identification firstly requires an interpretation of the contract documents, followed by a documented description of the activity viewed as beyond these requirements. The following tips should be considered on a contract to prevent claims:

- terms and conditions that apply to the work
- provisions relating to changes
- changed conditions
- The time schedule should match the contract scope.
- The important milestone should be included in the time schedule.
- Appropriate notice requirements.
- The technical specs should match the project strategy.
- The contract start date should be mentioned correctly.
- Project management package should be included in the WBS.
- The work progress procedure should be checked with the contract.
- The optional items of the contract should be checked with the contract.
- The contract terms should be matched with the attached time schedule terms.
- Inspection, spare parts, training, pre commissioning and... should be included in the time schedule and WBS attached to the contract.

4. Develop Project Management Plan:

The essential parts of the plan are the most important to claim prevention. Therefore, identification of a performance-based claim starts with sufficient knowledge of the project scope which leads to an awareness that some activity may involve a change in scope. Besides scope, a realistic schedule, and a suitable method of project execution tailored to the type of project, and an acceptable degree of risk involved, eliminates claims.

A configuration management plan should be developed. A configuration management plan Establishes an evolutionary method to consistently identify and request changes to the baselines, evaluates those changes, and provides a mechanism communicate all approved and rejected changes (Kazemipoor & Shirazi, 2009).

Change management plan should be developed. Change management plan, defines how to management changes. The change management system procedure should be prepared by a qualified team and the project team members should be involved in the preparation of the change management plan. Finally, the change management plan should be checked by a third party.

5. Execute project:

During executing the project, information must be distributed to stakeholders and configuration must be solved.

6. Monitor and control project:

The change control system must be used in the performing organization. To prevent claim changes must be assessed by the following steps: Assessing the change, looking for options, updating the status of the change in the change control system, Adjusting the PMP and project documents and finally Managing the project to revised PMP and project documents.

7. Identify potential claims:

From the client's perspective, the goal for claim management is to prevent claims. To do so, one must first possess potential claim situations, either contractual or performance-based. Therefore, identification of a claim starts with sufficient knowledge of the project scope and contract requirements, which leads to an awareness that some activity may involve a change in scope or the contract.

8. Document the potential claims:

The following information must be described and should be well recorded as Pending potential claims:

- The work believed to be outside of the contract
- Where it occurred
- When it took place.
- A statement of why it is not covered in the contract scope and reference to the section of the contract that supports the contention.
- Document of activities that were affected and who performed the work.
- The project schedule and the extra contract time, if required, to perform this extra work.
- photographs and videos of the work in question
- related contract sections and drawings
- Related statements of persons involved in or related to the claim work.
- Any correspondence, instructions, approved details, or in shop drawings related to the claim
- As-built schedule information for the time and work days for performance of the claim.
- separate cost accounting for claimed extra work

9. Assess the contractor's claim

Even with a concerted effort to prevent claims, they still may occur. There may be an understandable disagreement as to whether or not the claim in question is a change to the contract, or whether the claimed amount of compensation or time requested is correct or not. When this situation arises, a step-by-step process is set in motion to resolve these questions (Rosenberer et al, 2021).

Once a claim has been reviewed, a decision must be made to determine if a claim is worthy of pursuit. An adequate assessment should be made and the potential claim in terms of additional compensation, a time extension to the contract completion, or both should be quantified. Then a cause and effect approach to determine the full effect of the claimed extra work or delay activity and the full effect on the construction work caused by the claimed item should be used. Finally, the costs or damages resulting from the claimed activity and time extension should be calculated.

10. Claim Resolution

It is obvious that the longer this process takes the more costly and disruptive it is to both parties. Therefore, the goal is to settle these issues soon and at the lowest point in the organization as feasible. The process begins with negotiation, perhaps at more than one level, before moving on to mediation, arbitration, or litigation, depending upon the remedies afforded by the contract (Rosenberer et al, 2021).

Alternative methods of resolution have been increasingly used because of the proliferation of claims in construction and the expense of litigation. These alternative methods, called ADR for alternate dispute resolution, may include mediation, arbitration, and mini-trials.

5. Framework Evaluation

The proposed framework has been examined by a questionnaire Based on statistical analyses (Binomial and Mean tests). Results assumptions will be described below:

Hypothesis 1: Experts' opinion in the questionnaire will follow the normal distribution.

Klmgvgrf-Smimov test results indicate a mismatch for distribution data with normal distribution, but in this all of components don't follow the normal distribution, therefore, nonparametric tests (Ratio Test) were used to measure model.

Hypothesis 2: The model is confirmed by experts.

Based on Klmgvgrf-Smimov test result, the first hypothesis is rejected; then to measure the acceptance / rejection of model, Ratio Test is used. If all components of the hypothesis are confirmed, final hypothesis: "The whole model is approved"; will be approved. The hypothesis was rejected if all the components were rejected. Otherwise, the final judgment about the hypothesis will be difficult. In this study, Likert scale was used for the questionnaire. So, this must be converted to ordinal scale and proportion can be defined as follows:

"Completely agree" and "Agree" options: Ok

"No Comment", "Disagree" and "Completely Disagree" options: Not ok

Then the ratio of three options to five options is 0.6. If the ratio is less than 0.6, the number of people confirming the anthology would increase. So, ith hypothesis is as follows:

$\{H_0: P \geq 0.6$ ith component in the model is not approved.
 $\{H_1: P < 0.6$ ith component in the model is approved

According to the results of this test, the significance level is less than 0.05 Thus H_0 will be rejected and H_1 will be confirmed with 95% confidence.

Thus, all components of the model were accepted with a confidence of 95% and the final hypothesis: "The whole model is approved" has been confirmed with 95% confidence.

6. Conclusion

During the project's lifecycle many claims take place that should be controlled. In this paper by the base on the PMBOK and the documents of Persian Gulf Star Gas Condensate Refinery project in Bandar Abbas the concept of change and claim were presented and a questionnaire list was established. The questionnaire had been divided to 5 categories; initiating, planning, executing, control and closing process groups. By the use of the Pareto Law and an analysis on the causes of claim, the first nine main causes of claims in the projects were identified. Then on the base of the causes of claims and the processes of the PMBOK, a management process for preventing and managing claims were developed.

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